The Hydro Instruments Sample Water Recovery System allows sample water from any analysis device that would otherwise go to a drain to be returned to the process line.

This document gives an overview of the Sample Water Recovery System, its individual components, parts, installation and operation.

Overview

The Hydro Instruments water recovery system is designed to allow any device that uses a continuous flow of sample water to inject that sample water back into the process line from which it came. This eliminates the need to dispose of the sample water to a sewer drain or similar. The recovery system accomplishes this by allowing the drain water from the device to enter a reclaim reservoir which is connected to a venturi nozzle; the venturi nozzle draws the water out of the reservoir and injects it back into the process line.

Components

The Hydro Instruments Water Recovery system includes the following:

- **Water Recovery Manifold**—The recovery manifold acts as the reservoir for the sample water that is to be reintroduced back into the process line. It includes a sample water inlet, overflow connection, and a fine mesh screened air intake to prevent the build up of vacuum inside the manifold. NOTE: If the air intake becomes blocked the build up of vacuum within the recovery manifold may cause a negative head on the device discharging the sample water.

- **Ejector**—The ejector contains the venturi nozzle which creates the vacuum necessary to draw the water out of the reservoir and inject it back into the process line. The ejector incorporates a spring loaded ball check valve with an o-ring seat to prevent back flooding into the recovery system.

- **Tubing**—Polyethylene tubing is provided in two different sizes. 3/8” tubing for connecting the sample water inlet and ejector to the recovery manifold and 1/2” tubing for any overflow that may occur.

- **Insect Screen**—There is a protective insect screen included that is to be slipped over the end of the 1/2” overflow tubing.

- **Mounting Hardware**—The Hydro Instruments Water Recovery System includes wall mounting hardware.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vacuum to Ejector</td>
<td>10-6-6</td>
</tr>
<tr>
<td>2.</td>
<td>Inlet – Drain water from device</td>
<td>10-6-6</td>
</tr>
<tr>
<td>3.</td>
<td>Overflow to drain</td>
<td>10-8-6</td>
</tr>
<tr>
<td>4.</td>
<td>Water reservoir (clear)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Air intake assembly</td>
<td></td>
</tr>
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</table>
Components—The Ejector

In order for the ejector to function, certain hydraulic requirements are necessary. In some cases a booster pump will be needed to create the hydraulics required. Please refer to the chart below to determine the required flow and pressures for your application. For a parts drawing of the injector please see page five.

![HCE-1 Ejector #4 Hydraulics Chart (20 GPH max)](chart)

**NOTE:** The ejector should have some amount of back pressure. This prevents what is referred to as “jetting”. Jetting causes a loss of vacuum.

Installation

Before installing the Hydro Instruments Water Recovery System, first determine whether the sample water is suitable for being returned to the process line. Do NOT use this system if the water is found to be unacceptable for reintroduction.

**Ejector Installation**

In many cases the use of unions will make the ejector installation much easier. It is recommended that a water inlet valve, Y-strainer and pressure gauge be installed on the inlet side of the ejector as well as a pressure gauge on the outlet side. While installing make sure that the ejector is facing the appropriate direction. There are arrows machined into the long portion of the ejector that indicate water flow direction. See the following page for an installation example.

1. Thread one end of the ejector by hand into 3/4" female NPT connection. Use a pipe wrench on the outlet side (longer portion) to tighten. Use caution when tightening the plastic threads.
2. Connect the opposite end to 3/4" female NPT -or- 1" hose. If using a hose make sure to clamp down on the hose barb on the ejector. **NOTE:** Do NOT remove NPT threading if using hose.

**Testing the Ejector**

The ejector should be tested after installation to ensure proper operation and sufficient vacuum creation.

- If operating under normal system pressure (i.e. no booster pump) open the water inlet valve to the ejector and feel for suction at the fitting.
- If using a booster pump, open the water inlet valve to the ejector and the pump then start the pump. If the booster pump is operating appropriately and the ejector is installed in the right direction there should be a strong suction at the fitting.
- If the ejector has tested satisfactorily move on to connecting it to the recovery manifold. If there is a lack of suction at the fitting please refer to the Troubleshooting section on the following page.
Water Recovery Manifold Installation

The water recovery manifold comes with complete wall mounting hardware.

1. Mount the recovery manifold using the supplied mounting hardware in a location close to and lower in elevation than the device from which you will be recovering sample water. Make sure that the air intake will not be blocked or exposed to chemical fumes when choosing a location.
2. Using the 3/8” tubing, connect the bottom of the recovery manifold to the tubing connector on the ejector.
3. Using more of the 3/8” tubing, connect the drain of the device water is to be recovered from to the inlet on the recovery manifold.
4. Use the 1/2” tubing from the overflow connection to a sewer drain or similar. Slip the insect screen cap over the end of the overflow tubing. Make certain the overflow tube descends in elevation from the manifold to the selected drain point.

See the following page for an installation example using a continuous online residual analyzer.

System Startup

After installing and testing the ejector and mounting the recovery manifold to the wall, you should be ready to start the system.

1. Connect the sample water and overflow tubing as indicated in the system diagram on page four.
2. Open any water inlet valves to the ejector and/or booster pump and start the pump if one is being used. Verify proper operation.
3. Start the flow of water to enter the recovery manifold.
4. The water entering the manifold should not pool noticeably (or rise) inside the manifold. If the water is rising towards the overflow then refer to the troubleshooting section.

NOTE: The water entering the recovery manifold should not exceed 20 gallons per hour.

Troubleshooting

No Vacuum or Insufficient Vacuum

If there is no vacuum or insufficient vacuum at the ejector fitting try the following:

- **Installation**—Make sure that the ejector and booster pump are installed properly, there are arrows machined into the long portion of the ejector that indicate water flow direction. Check for any closed valves.
- **Nozzle**—The nozzle may be clogged or obstructed. Remove the ejector and clean it thoroughly taking care not to damage the nozzle orifice. In the event of mineral build-up clogging the nozzle, place the ejector in a muriatic acid and hot water solution for several minutes and then rinse with water.
- **Hydraulics**—A drop in inlet pressure or increase in back/outlet pressure can cause vacuum loss. Check your inlet and outlet pressures against the nozzle hydraulics chart on page two.
Troubleshooting

Water Draining From Overflow
If there is water draining out of the recovery manifolds overflow port try the following:

- **Ejector Check Valve Failure**—Objects or material is preventing the closure of the ejector check valve. The ejector should be serviced.
- **No Vacuum or Insufficient Vacuum**—If the ejector is not producing vacuum or sufficient vacuum then the recovery manifold can not be drained of the water that enters it or can be drained quickly enough. Refer to the “No Vacuum or Insufficient Vacuum” section on the previous page.

Sample Water Forcefully Being Pulled From Analysis Device
If you’re experiencing sample water forcefully being pulled from your analysis device try the following:

- **Negative Head**—Check that there is not an obstruction blocking the air intake assembly of the recovery manifold or that the screen has not become clogged with debris.

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Water Recovery System Installation Example
Hydro Instruments Series RPH-250 Probe Style Residual Analyzer
HCE-1 Compact Ejector Parts Diagram

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<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>1</td>
<td>Compact Ejector Body (#4 shown)</td>
<td>1</td>
<td>CEB-4</td>
</tr>
<tr>
<td>2</td>
<td>Spring</td>
<td>1</td>
<td>SPH-520-001</td>
</tr>
<tr>
<td>3</td>
<td>Check Ball</td>
<td>1</td>
<td>CB-100</td>
</tr>
<tr>
<td>4</td>
<td>3/8&quot; NPT x 3/8&quot; Tube Connector</td>
<td>1</td>
<td>TCH-100-101</td>
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<tr>
<td>5</td>
<td>O-Ring</td>
<td>1</td>
<td>3RS-108</td>
</tr>
</tbody>
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